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FRAGMENTED AMBITIONS: ANALYSING BANGLADESH'S RENEWABLE ENERGY POLICY LANDSCAPE

Abstract

Despite being committed to SDG 7 and nationally determined contribution (NDC), Bangladesh's progress in the renewable energy (RE) sector has been sluggish. Since 2008, Bangladesh has set up multiple Renewable Energy (RE) generation targets, but has fallen short of achieving its target each time by a significant gap. In this context, the article analyses Bangladesh's renewable energy policies using a comprehensive analytical framework that categorises interventions across five domains: policy instruments, financial support, technological development, governance, and supporting policies. Using qualitative research methodology, the study finds that Bangladesh's RE policy landscape is fragmented, poorly coordinated, and characterised by vague targets, limited R&D investment and inadequate financial incentives. The absence of binding commitments and a clear implementation roadmap further hampers progress. Hence, this study attempts to propose strategic reforms to streamline RE targets, enhance institutional coordination, attract investment, and engage local stakeholders, aiming to facilitate progress in the RE sector of Bangladesh.

Key words: Renewable energy, Bangladesh, Energy Policy

1. Introduction

Energy transition, the shift from a fossil fuel to renewables, provides opportunities to mitigate greenhouse gas emissions while ensuring a secure, affordable, and sustainable supply of energy for all.[1] Though fossil fuels still dominate the global energy market, remarkable progress has been made in the renewable energy sector. Renewables are projected to taking over coal as the largest source of electricity generation by 2025.[2] In 2023, the world experienced an unprecedented increase in renewable energy capacity, totaling 510GW.[3] The price of renewables is continuing to decline compared to fossil fuels, and geopolitical tensions have also influenced many nations' attempts to reduce their dependency on imported fossil fuels, leading to a boost in the renewable sector.

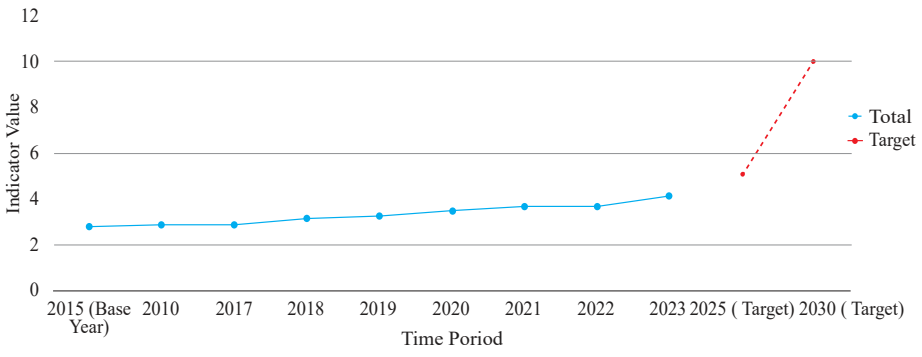
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[1] United Nations, 'Five Ways to Jump-Start the Renewable Energy Transition Now', United Nations (United Nations), accessed 6 February 2024, https://www.un.org/en/climatechange/raising-ambition/renewable-energy-transition.
[2] 'Executive Summary – Renewables 2023 – Analysis', IEA, accessed 22 January 2024, https://www.iea.org/reports/renewables-2023/executive-summary.
[3] 'Executive Summary – Renewables 2023 – Analysis'.

The end of this decade also marks the end of one of the biggest development goals of the world, the Sustainable Development Goals (SDGs). Inevitably, the world will observe the progress made in achieving SDG 7. In implementing SDG 7, Bangladesh has selected two SDG 7 targets as its priority. One of these is achieving 100 per cent electrification, and the other one is increasing the percentage of electricity from the renewable sector. However, when it comes to progress, there have been issues for concern. Although Bangladesh has achieved significant improvements in the first SDG 7 target, progress on the second target regarding renewable energy has been sluggish. Despite the government's interest, this sector has not gained much attention. The progress of the other SDG 7 targets is also in a challenging position.

Figure 1: Bangladesh's progress in SDG 7 (Renewable energy share in the total final energy consumption)



Source: SDG tracker Bangladesh, https://sdg.gov.bd/indicator-information/SHx3FhT

Last year, the country saw the biggest addition to renewable energy, with an additional 200MW added in a single year.[4] Despite that, the renewable energy percentage in the power sector is only 5 per cent (see table 1).[5] The government is already falling far short of the target to achieve 10 per cent of generation from clean energy sources by 2030.[6] This is far lower than the renewable energy target of 30 per cent in 2030 as seen in the Mujib Climate Prosperity Plan and the government's plan of reaching government goals of 40 per cent by 2041.[7] On the other hand, the draft

[4] Asifur Rahman, 'Clean Energy Goal Far Away', The Daily Star, 10 June 2025, https://www.thedailystar.net/news/bangladesh/news/clean-energy-goal-far-away-3529101.

[5] 'Electricity Generation Mix | National Database of Renewable Energy', accessed 18 February 2024, https://ndre.sreda.gov.bd/index.php?id=7.

[6] Md Tahmid Zami, 'In Bangladesh, Solar Power Brings Work, but Land Shortage Slows Growth', *Reuters*, 24 August 2022, sec. Sustainable Business, https://www.reuters.com/business/sustainable-business/bangladesh-solar-power-brings-work-land-shortage-slows-growth-2022-08-24/.

[7] 'Adviser Rizwana: Bangladesh Needs Fair Support for Renewable Energy Transition', Dhaka Tribune,

renewable policy 2025 is even more ambitious, with targets of generating 20 per cent of electricity (6145 MW) from renewable sources by 2030 and producing 30 per cent of electricity (17,470 MW) by 2041.[8] The existing investments and initiatives in the sector are far from what is necessary to meet the goals. Moreover, there are accusations of corruption in many of the grassroots solar panel projects, which might be hindering the further spread of renewable energy in remote areas.[9] All of these issues are challenges for the sector.

Table1: Bangladesh Energy Generation Mix

Fuel/Resource	Installed Capacity (MW)	Share (per cent)
Coal	7,179	22.92
Gas	12,384	39.54
HFO	5,885	18.79
HSD	290	0.93
Imported	1,160	3.7
Renewable	1,625.42	5.19
Captive	2,800	8.94
Total	**31,323.42**	

Source: SREDA, August 2025.

On the other hand, Bangladesh will eventually run out of domestic fossil fuels which may lead to more dependency on imported fuels.[10] The country's energy mix remains heavily dependent on Natural Gas, with 39.54 per cent of the electricity being generated from this one source.[11] The lack of fossil fuel material

accessed 19 November 2024, https://www.dhakatribune.com/bangladesh/power-energy/365543/adviser-rizwana-bangladesh-needs-fair-support-for.https://www.dhakatribune.com/bangladesh/power-energy/365543/adviser-rizwana-bangladesh-needs-fair-support-for.",",plainCitation":"'Adviser Rizwana: Bangladesh Needs Fair Support for Renewable Energy Transition', Dhaka Tribune, accessed 19 November 2024, https://www.dhakatribune.com/bangladesh/power-energy/365543/adviser-rizwana-bangladesh-needs-fair-support-for.",",noteIndex":7},",citationItems":[{"id":1469,"uris":["http://zotero.org/users/4584671/items/79A2B9VM"],"itemData":{"id":1469,"type":"webpage","abstract":"Syeda Rizwana Hasan, Adviser to the Ministry of Environment, Forests, Climate Change, and Water Resources, highlighted Bangladesh's challenges in transitioning to renewable energy and emphasized the need for timely and equitable financial and technological support. Despite...","container-title":"Dhaka Tribune","language":"en","title":"Adviser Rizwana: Bangladesh needs fair support for renewable energy transition","title-short":"Adviser Rizwana","URL":"https://www.dhakatribune.com/bangladesh/power-energy/365543/adviser-rizwana-bangladesh-needs-fair-support-for","accessed":{"date-parts":[["2024",11,19]]}}}],"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"}

[8] Khondaker Golam Moazzem et al., *Renewable Energy Policy (Draft) 2025*, n.d.; Draft Renewable Energy Policy 2025.

[9] 'Corruption Is Dimming Solar Power, Too', The Daily Star, 8 December 2023, https://www.thedailystar.net/opinion/editorial/news/corruption-dimming-solar-power-too-3489096.

[10] Somoy News, 'Bangladesh will "run out of gas in 11 years" | Bangladesh', Somoy News, accessed 14 March 2024, https://en.somoynews.tv/news/2022-11-02/bangladesh-will-run-out-of-gas-in-11-years.

[11] SREDA, National Database of Renewable Energy, https://ndre.sreda.gov.bd/index.php?id=7, accessed on 13 August 2025.

in the energy production sector might cost us the ability to produce the electricity required to meet the national demand. The Integrated Energy and Power Master Plan (IEMEP) 2023, which attempts to be a futuristic guideline for the energy sector of Bangladesh, has attracted a number of criticisms, including faulty energy and power demand forecasting, encouraging coal exploration, and promoting LNG import.[12] At this point, the energy market is showing that solar and onshore wind energy have matured quite a lot.[13] Thus, the renewable energy represents the most viable pathway for the future.

Renewable energy in Bangladesh has been studied by many scholars over the years, who come from different academic backgrounds. Most of these studies dealing with renewable energy development follow a general pattern; they start by providing a broad description of the current energy scenario of Bangladesh and highlight the need for the energy transition. For example, Mohazzem et al,[14] focus on the current energy scenario of Bangladesh and stress the need for an energy transition based on the depleting fossil fuels of the country. They also provide an overview of renewable energy. Islam et al[15] also take a similar approach, stressing the importance of renewable energy for the net-zero goal of Bangladesh. Abdul Razzak et al[16] also analyse the existing energy scenario in Bangladesh but focus on the need for energy diversification efforts in the country. Al-tabatabaie et al[17] have done a similar study with a focus on decarbonisation.

There are some scholars who break this pattern. For example, Mahmud and Roy[18] focus on barriers to renewable energy expansion specifically and use Interpretive Structural Modeling to categorise the national-level barriers into seven different categories. As part of a PhD thesis, their article goes in-depth about the

[12] Helen Preoty, *CPD Power and Energy Study Power and Energy Sector Reform Agenda for the Interim Government*, n.d.

[13] International Energy Agency, 'Wind', accessed July 30, 2025, https://www.iea.org/energy-system/renewables/wind.

[14] Shah Mohazzem Hossain, Sagor Biswas, and Md Raihan Uddin, 'Sustainable Energy Transition in Bangladesh: Challenges and Pathways for the Future', *Engineering Reports* 6, no. 1 (2024): e12752, https://doi.org/10.1002/eng2.12752.

[15] Emadul Islam, Asheer Shah, and Tariq A. Karim, 'Role of Renewable Energy Policy in Ensuring Net-Zero Carbon Emissions and Energy Sustainability: A Bangladesh Perspective', in *Moving Toward Net-Zero Carbon Society: Challenges and Opportunities*, ed. Hsing-Hao Wu, Wan-Yu Liu, and Michael C. Huang (Cham: Springer International Publishing, 2023), 59–77, https://doi.org/10.1007/978-3-031-24545-9_4.

[16] Lway Faisal Abdulrazak, Aminul Islam, and Md. Biplob Hossain, 'Towards Energy Sustainability: Bangladesh Perspectives', *Energy Strategy Reviews* 38 (1 November 2021): 100738, https://doi.org/10.1016/j.esr.2021.100738.

[17] Kusay Faisal Al-tabatabaie et al., 'Taking Strides towards Decarbonization: The Viewpoint of Bangladesh', *Energy Strategy Reviews* 44 (1 November 2022): 100948, https://doi.org/10.1016/j.esr.2022.100948.

[18] Hasan Mahmud and Joyashree Roy, 'Barriers to Overcome in Accelerating Renewable Energy Penetration in Bangladesh', *Sustainability* 13, no. 14 (January 2021): 7694, https://doi.org/10.3390/su13147694.

existing barriers in the energy sector. It provides some important suggestions, which were to transform the current top-down process in policy and governance in the energy sector in Bangladesh.

Gulagi et al[19] used the LUT Energy System Transition model to forecast four different policy scenarios for Bangladesh. According to them, Bangladesh can achieve 100 per cent renewable energy by 2050, if the country appoints the right energy policies. They also suggest that a solar-based policy will be significantly cheaper than the current policy scenario (based on PSMP 2016). They focus on the importance of not introducing any more fossil fuel-based plants and investing in biomass and solar battery storage technologies.

The literature come up with some common criticisms of the energy sector in Bangladesh. They identified a lack of investment, inadequate policy support, and land constraints and limited institutional capacity as barriers to the energy transitions in Bangladesh However, this raises the question of why, despite becoming common knowledge, these issues have not been addressed through policy intervention. Another observable trend can be found, none of these studies focus on the enabling environment, and they do not investigate what policies are necessary for enabling energy transition.

Overall, the existing literature on renewable energy in Bangladesh shows two gaps.First, it does not consider the enabling policy mix. Two, they do not consider global best practices or policy suggestions. Globally, some studies focus on effective policy mixes and enabling environments for renewable energy.[20] Other scholars have tried to analyse the human aspects of policy processes such as learning, expectations and communication.[21] Therefore, what is missing is a comprehensive study that integrates all aspects, identifies the necessary policy mix for promoting energy transition, and provides policy suggestions tailored to Bangladesh. This study will try to contribute to that aspect.

[19] Ashish Gulagi et al., 'Current Energy Policies and Possible Transition Scenarios Adopting Renewable Energy: A Case Study for Bangladesh', *Renewable Energy* 155 (1 August 2020): 899–920, https://doi.org/10.1016/j.renene.2020.03.119.

[20] Karolina Daszkiewicz, 'Policy and Regulation of Energy Transition', in *The Geopolitics of the Global Energy Transition*, ed. Manfred Hafner and Simone Tagliapietra (Springer International Publishing, 2020), https://doi.org/10.1007/978-3-030-39066-2_9; Jean-Michael Glachant, *A Comparative Study of Renewable Energy and Electricity Access Policies and Regulatory Frameworks in the Indian Ocean Islands: The Case of Mauritius, Seychelles, Madagascar and Comoros.* (Publications Office, 2018), https://data.europa.eu/doi/10.2870/03206.

[21] Pasquale Marcello Falcone et al., 'Instrument Mix for Energy Transition: A Method for Policy Formulation', *Technological Forecasting and Social Change* 148 (November 2019): 119706, https://doi.org/10.1016/j.techfore.2019.07.012; Turlough F Guerin, 'Why Sustainable Innovations Are Not Always Adopted', *Resources, Conservation and Recycling* 34, no. 1 (2001): 1–18, https://doi.org/10.1016/S0921-3449(01)00085-4.

The objective of this study is to provide an analysis of Bangladesh's renewable energy policy and suggest measures for promoting renewable energy. To this end, it will ask the following questions:

- What are the gaps in the existing Renewable energy policy of Bangladesh?
- How can Bangladesh better promote development in the RE sector?

Exploratory research has been conducted, based on qualitative methodology drawing from a diverse array of data sources that are both primary and secondary. It will also analyse key national plans and policies for the energy sector, including but not limited to Renewable Energy Policy 2025, Integrated Energy and Power Master Plan (IEPMP) 2023, Energy Efficiency and Conservation Masterplan, Energy Efficiency and Renewable Energy SREDA Action Plan 2021-25, National-Solar-Energy-Roadmap-2021-2041. UN, IEA, IRENA and other international organisations' policy documents will also be reviewed. The research will also use books, journal articles, newspaper reports and websites. This was supplemented by one-on-one interviews with renewable energy and energy policy practitioners and academics working on the issue.

The article will be divided into five sections, including an introduction and conclusion. The second chapter will include a conceptual framework. The third chapter will analyse the current energy policy documents of Bangladesh. The fourth chapter will provide policy suggestions about how Bangladesh can address the challenges in integrating renewables into its energy mix. The fifth section will conclude the paper.

2. Analytical Framework

Renewable energy is energy derived from natural sources that are replenished at a higher rate than they are consumed.[22] Solar, Wind, Geothermal, Hydropower, and ocean energy are some of the common renewable energy sources. They are distinct from clean energy, which includes nuclear energy. While a countries' renewable energy development is widely varied depending on the projected demand, economic growth, resource endowment, and geographical location, certain policy interventions are common to facilitate the development of the renewable energy sector. For the purpose of the paper, the author has tried to investigate and compile these policies, and examine whether they are present in Bangladesh. To achieve

[22] United Nations, 'What Is Renewable Energy?', United Nations, United Nations, accessed 19 August 2025, https://www.un.org/en/climatechange/what-is-renewable-energy.

this, evidence has been gathered from the experiences of other countries and existing literature. Globally, there are a number of studies that look into the 'ideal' policy mix for energy transition. Borozan[23] looks into the policies of European Union Countries and finds that coupling energy efficiency with renewable energy transition is key. He found that grants, feed-in tariffs/premiums, strategic plans, and renewable/non-fossil energy obligations were key policy interventions required for promoting renewable energy. Glachant[24] in his study of energy transition in Indian Ocean islands, he focuses more on the economic incentives and regulatory policies. He believes that taking a portfolio approach towards promoting renewable energy and providing quantity instruments for setting targets and regulating prices as well as government procurement and tenders, can be instrumental in the energy transition. Daszkiewicz,[25] on the other hand, takes an evolutionary approach, looking into the policies taken by countries in the renewable energy arena over the last twenty years. She comes up with a comprehensive category of policies (see Annex 1), highlighting the applicability of those in each sector of energy transition. Among them, the importance of education, training and information dissemination are heightened.

On the other hand, there is some literature focusing on energy transition in low/middle-income countries. Liao et al[26] take a micro-level approach and look into the transition to clean cooking methods at the household level. Alola and Joshua[27], on the other hand, focus on the impact of globalisation and trade and CO_2 emissions. These articles do not look into policy suggestions or look at energy transition as a whole. Kabir et al[28] focus on the nexus between renewable energy and climate change and analyze the trend of renewable energy transition in the developing economies. They suggest investment in R&D, market expansion, and proactive fiscal and monetary policy support as their recommendation.

[23] Dj Borozan, 'Detecting a Structure in the European Energy Transition Policy Instrument Mix: What Mix Successfully Drives the Energy Transition?', *Renewable and Sustainable Energy Reviews* 165 (1 September 2022): 112621, https://doi.org/10.1016/j.rser.2022.112621.

[24] Glachant, *A Comparative Study of Renewable Energy and Electricity Access Policies and Regulatory Frameworks in the Indian Ocean Islands: The Case of Mauritius, Seychelles, Madagascar and Comoros.* (LU: Publications Office, 2018), https://data.europa.eu/doi/10.2870/03206.

[25] Karolina Daszkiewicz, 'Policy and Regulation of Energy Transition', in *The Geopolitics of the Global Energy Transition*, ed. Manfred Hafner and Simone Tagliapietra (Cham: Springer International Publishing, 2020), 203–26, https://doi.org/10.1007/978-3-030-39066-2_9.

[26] Chuan Liao et al., 'Clean Energy Transitions and Human Well-Being Outcomes in Lower and Middle Income Countries: A Systematic Review', *Renewable and Sustainable Energy Reviews* 145 (1 July 2021): 111063, https://doi.org/10.1016/j.rser.2021.111063.

[27] Andrew Adewale Alola and Udi Joshua, 'Carbon Emission Effect of Energy Transition and Globalization: Inference from the Low-, Lower Middle-, Upper Middle-, and High-Income Economies', *Environmental Science and Pollution Research* 27, no. 30 (1 October 2020): 38276–86, https://doi.org/10.1007/s11356-020-09857-z.

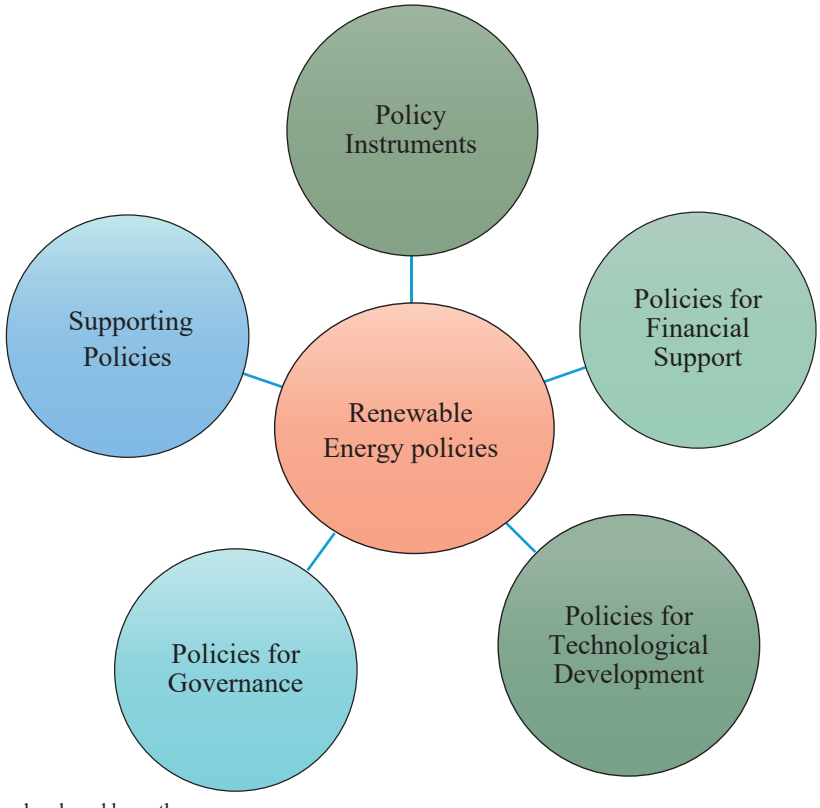
[28] Mahfuz Kabir et al., 'Chapter 14 - Climate Change, Sustainability, and Renewable Energy in Developing Economies', in *Renewable Energy and Sustainability*, ed. Imran Khan (Elsevier, 2022), https://doi.org/10.1016/B978-0-323-88668-0.00001-2.

Since the paper is going to investigate why the renewable energy sector is not moving forward, it will also look into some literature about why some sustainable solutions might not be adopted. Here, Gurin's[29] article provides some important insight. He argues that in theory, adopting sustainable practices that address economic, environmental, and social concerns should be easy. However, Gurin argues that perception, attitudes, and communication have an important role to play in the adaptation of sustainable practices. Therefore, there is a need to align the policy makers' and practitioners' perceptions in promoting sustainability. Falcone et al.[30] also focus on networking, learning, and convergence of expectations. Using a social network analysis, they explored how an effective policy can be formulated using feedback, problem solving and communication among actors.

Based on the above discussion, the paper tries to develop an analytical framework that would help it to evaluate the renewable energy policies of Bangladesh and highlight the missing parts. The framework builds upon Daszkiewicz's[31] framework for policies of energy transition (see annex 1 for details) taking into consideration the needs of developing country such as Bangladesh. In addition to the review of literature and policies of other countries, this framework adds more elements based on expert interviews to make it more holistic. For example, renewable transport, and District Heating and Cooling are a major concern for developed countries' energy transition, in developing countries such as Bangladesh, the transition to clean cooking in households holds more importance as reflected by the clean cooking initiatives taken by Infrastructure Development Company Limited (IDCOL).[32] In this framework, the policies regarding renewable energy are divided into five major categories: Policy instruments, Policies for Financial Support, Policies for Technological Development Policies for Governance and Supporting Policies.

[29] Turlough F Guerin, 'Why Sustainable Innovations Are Not Always Adopted', *Resources, Conservation and Recycling* 34, no. 1 (1 December 2001): 1–18, https://doi.org/10.1016/S0921-3449(01)00085-4.
[30] Pasquale Marcello Falcone, Antonio Lopolito, and Edgardo Sica, 'Instrument Mix for Energy Transition: A Method for Policy Formulation', *Technological Forecasting and Social Change* 148 (1 November 2019): 119706, https://doi.org/10.1016/j.techfore.2019.07.012.
[31] Daszkiewicz, 'Policy and Regulation of Energy Transition'.
[32] Infrastructure Development Company Limited (IDCOL). "Improved Cook Stove Program." IDCOL, 2014, accessed July 30, 2025, https://idcol.org/home/ics.

Figure 2: Renewable Energy Policies for energy transition



Source: developed by author

As shown in the diagram, the target and strategy category include national and international targets and strategy and policy documents that guide the implementation of target. Here, the targets are expected to have three qualities- mandate (voluntary or binding), structure and context. The second set of policies is for financial support to the sector. These include- subsidies, feed-in tariffs, corporate power purchase agreements, tax benefits and renewable auctions. The third set of policies is regarding technological advancement- these include two broad categories- energy efficiency policies (such as efficiency requirement obligations and mandates) and technological advancement, research and development, investments and commercialisation. The fourth set of policies is related to governance- this includes an implementation plan, a regulatory and overseeing body and coordination with the sectoral plan. Finally, the supporting policies include education and awareness, training and other supporting policies such as lowering CO_2 emissions etc. The following section will investigate the existing renewable energy policies and identify what are the missing components of the existing policy scenario.

3. The Renewable Energy Policies of Bangladesh: A Review

At present renewable energy is only 4 per cent of the total energy supply of Bangladesh, a major part of which comes from the hydropower plant in Kaptai. Other than that, a significant part of the renewable energy comes from the off-grid solar home systems. Table 2 shows an overall view of the renewable energy sector of Bangladesh.

Table 2: Current state of renewable energy	
Issues (Renewable Energy)	01 June 2025 (MW)
Power Generation Capacity (On-Grid)	1182.52
Power Generation Capacity (Off-Grid)	380.24
Total Power Generation Capacity	1562.76 MW

Source: SREDA website and BPDB Annual Report 2022-23.

But overall, the share of renewable energy is still less than 5 per cent of the total production capacity, and progress has been very slow in the sector's growth. This section will analyse the renewable energy policies in Bangladesh using the framework described in the previous sector.

3.1 *Policy instruments*

Policy instruments are the backbone of the renewable energy sector. It includes government policies, strategies and action plans. This includes national and sectoral plans. Ideally, there should be targets that focus on short, medium and long-term goals. These policy instruments should outline targets that are designated as either binding or non-binding. For this purpose, the paper reviews the following documents: the draft renewable energy policy 2025, the Integrated Energy and Power Master Plan (IEPMP) 2023, the renewable energy policy 2008, the solar system master plan and the 8th five-year plan. Other than these, sectoral and overarching plans such as the Nationally Determined Contribution (NDC), Bangladesh Delta Plan 2100 (BDP2100), Perspective Plan 2021-2041 (PP2041), and 8th Five-Year Plan July 2020-June 2025 (8FYP) also have plans for the expansion of renewable energy. There is a gap between the targets in the various policy documents and the target difference is one of the major problems in the policy making in the renewable energy sector and achievement of SDG 7.

The Integrated Energy and Power Master Plan (IEPMP) is the main policy document that is supposed to guide the future of the energy sector in Bangladesh. The plan is an attempt by the government to bring harmony to the sector through an overarching plan. However, for the renewable energy sector, the plan does not mention

any specific target, which is a departure from the previous PMSP 2016. In the section regarding CO2 emission, it is implied that renewable energy will be 5.7 per cent by 2030, 8.9 per cent by 2041 and 12.2 per cent by 2050, which is significantly lower than the draft renewable energy policies' goals of 30 per cent by 2041.[33] Rather, the plan provides an ambiguous definition of clean energy and focuses on nuclear power, ammonia-fired, and hydrogen-fired thermal power, all of which are technologies that have not been fully matured yet. Therefore, it will be extremely hard for the government to achieve 40 per cent of energy from either clean or renewable sources. In the Perspective Plan 2021-2041 (PP2041), the renewables and energy imports are predicted to jointly supply 35 per cent of the energy mix. The Delta Plan 2100 (approved in September 2018), on the other hand, has declared a target to generate 30 per cent of the total energy from renewables by 2041. With the latest draft renewable energy policy, which also targets 30 per cent from renewable sources by 2041.

Bangladesh government's 8th Five Year Plan (8FYP), mentions improving energy efficiency gain, renewable energy and financial stability as sector goals. However, renewable energy is only mentioned as a source of diversifying energy resources and there are no goals in the plans that specifically mention renewable energy goals. It also notes that the share of renewable energy has declined from 3.6 per cent in FY 2015 to 3.05 per cent in FY 2020, rather than increasing. It declares that "RE generation strategy will have to be aggressively pursued so that all that is planned gets implemented in time and where policy support is required should be given forthwith" (8th Five-year plan, 2). Overall, the plan does not have any particular target for renewable energy, nor does it have any specific plans for the development of the sector. This reflects that while there are plans for reaching a target within a certain year, there is no incorporation of those plans into broader or sectional plans.

A National Solar Energy Roadmap, which was drafted in 2020, had calculated that 6,000 MW could be generated from solar by 2041 in a BAU scenario - and as much as 30,000 MW can be generated with aggressive policies. This map focused on both large-scale solar parks and rooftop solar. A highlight of the plan was focusing on local manufacturing which is helpful for the development of the local industry.

None of these targets Bangladesh has set have ever been binding, and the pathways to that goal of 30 per cent by 2041 have not been made clear in any

[33] Dhaka Tribune, 'Adviser Rizwana'.Adviser to the Ministry of Environment, Forests, Climate Change, and Water Resources, highlighted Bangladesh's challenges in transitioning to renewable energy and emphasized the need for timely and equitable financial and technological support. Despite...","container-title":"Dhaka Tribune","language":"en","title":"Adviser Rizwana: Bangladesh needs fair support for renewable energy transition","title-short":"Adviser Rizwana","URL":"https://www.dhakatribune.com/bangladesh/power-energy/365543/adviser-rizwana-bangladesh-needs-fair-support-for","accessed":{"date-parts":[["2024",11,19]]}}}],"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"}

formidable roadmaps. Even though the government has published a new draft renewable energy policy, that too is lacking from strategic planning.[34] There was a draft renewable energy policy in 2022, which has not been finalised or updated yet. The solar system master plan, as the name suggests is focused on only the solar, there are no detailed plans for the development of other renewable energy technologies such as wind, biomass, etc. While the IEPMP has plans for hydrogen and sulfur-based clean energy these are not immediately operational. On top of that Bangladesh's national plans do not have any connection to the local level which is also a major lacking. Overall, Bangladesh's renewable energy policy instruments lack set targets, action plans for plan implementation and local level involvement.

3.2 *Policies for Technological Development*

A major component of strengthening the renewable energy sector in any country is advancing renewable energy technology, either by fostering domestic innovation or facilitating technology transfer from abroad. In Bangladesh, research and development in any sector is neglected, and the renewable energy sector is not an exception to this rule. The major government policy papers provide little importance for developing local Research and Development in Bangladesh. The SREDA have established the Bangladesh Energy and Power Research Council which promotes and oversees research, development and innovation in the energy sector as an institute. It also provides financial grants for research on energy efficiency. In 2023, BEPRC formulated the Innovation Guideline-2023, along with Incubation, Entrepreneurship, and Lab Financing Guidelines to facilitate research activities.[35] The latest draft renewable energy policy has some important discussion regarding technology, including promoting local industries.

Another part of RE technology, another major part of the energy transition atmosphere, is energy efficiency technologies, which play an important role in achieving the SDGs. Investing in energy efficiency technologies will not only provide support for the energy transition but also help reduce the load on Bangladesh's overall energy system. Previously, the government had developed two plans- 'Energy Efficiency and Conservation Master Plan up to 2030', and 'Energy Efficiency and Conservation Rules and Action Plan. The Energy Efficiency and Conservation Master Plan was jointly developed by SREDA and the Power Division of the Ministry of Power, Energy and Mineral Resources (MPEMR) in 2015. In this document, the government declared the intention to reduce 20 per cent of primary

[34] Moazzem et al., *Renewable Energy Policy (Draft) 2025*, 20.

[35] 'Bangladesh Energy and Power Research Council (BEPRC)', accessed 4 December 2024, https://eprc.gov.bd/site/page/b0cdfa60-5ec6-4e7c-9415-baa8d47811f4/http%3A%2F%2Feprc.gov.bd%2Fsite%2Fpage%2Fb0cdfa60-5ec6-4e7c-9415-baa8d47811f4%2F-.

energy consumption per GDP by the year 2030. Besides energy efficiency, the IEPMP also focuses on the Carbon Capture System (CCS), which is not an energy production system but a mechanism that reduces carbon emissions. However, the national energy reports only report the progress of the reduction of system loss; there are scope for incorporating other energy efficiency technologies.

3.2 *Policies for Financial Support*

Financial policies are the backbone of the renewable energy sector because they require high investment. Since most renewable energy programs have high capital costs, financial policies can make the sector lucrative to investors. These policies can include feed-in tariffs, capital grants, soft loans, tax waivers, etc.[36]

A review of Bangladesh's existing policies shows that Bangladesh has not implemented feed-in tariff for the renewable sector. Rather, Bangladesh has been paying price of capacity charge for oil-based quick rentals.[37] The previous government stated that it had promoted credit facilities created by Bangladesh Bank for environment-friendly and green industries. However, there is a lack of private investment in the primary energy sector (8th five-year plan). Bangladesh Energy Regulatory Commission (BERC) has created three development funds in the power and energy sector, but no separate fund was created for the renewable energy sector. However, even with the lack of initiative in the sectors, the solar power generation cost is still lower than LNG and oil (Table 3). Therefore, it can be said that this price will become even cheaper with government intervention.

Table 3: Unit Cost of Generation (TK/per KWh)

Fuel Type in Generation	Unit Cost (Tk/KWH)
Furnace Oil (FO)	17
HSD	26
LNG	13
Imported Coal	8.1
Domestic Coal	6
Domestic Gas	2.57
Hydro	1
Solar Power Plant	12
Imported Power	6,48

Source: P8th Five-Year Plan 2020-2025, p. 364.

[36] Daszkiewicz, 'Policy and Regulation of Energy Transition'.
[37] Sarwar, 'We Are Paying for a Large Capacity without Using It - Towfiqul Islam | CPD', *Centre for Policy Dialogue (CPD)*, 28 February 2024, https://cpd.org.bd/we-are-paying-for-a-large-capacity-without-using-it/; 'Use of Oil-Based Plants to Keep Power Cost High', 21 August 2025, https://www.newagebd.net/post/power-energy/261799/use-of-oil-based-plants-to-keep-power-cost-high.

In Bangladesh, one good policy for encouraging consumers to become prosumers (individuals who both consume and produce electricity) is the Net Metering Guidelines, 2018. By integrating their renewable energy (RE) systems with the distribution grid through a bi-directional smart meter, any surplus production by the RE system is fed back into the grid via the net meter. For the excess electricity supplied to the grid, prosumers earn kWh credits, which can be carried forward until the settlement period concludes. A consumer can install (capacity of solar PV system) up to 70 per cent of his sanctioned load; [38]

The government has also been offering tax breaks for income from the renewable development sector since 2011. Recently, the government has declared that this tax break will continue to 2030, and the investors will benefit from this policy for the next 10 years.[39] More of such policies are needed to encourage investors in the sector. Additional policies of this nature are required to encourage investment in the sector.

3.4 Policies for Governance

Governance policies are crucial to ensure the plans and policies are implemented properly. This includes three major components. These are; establishing a regulatory body to oversee the sector, formulating guidelines for private sector participation, and maintaining coordination among national and sectoral plans. Moreover, including these national targets in local plans and programmes is also seen as an important policy component for the advancement of the renewable energy sector.

In Bangladesh, the advancement of renewable energy is not done by the Sustainable and Renewable Energy Development Authority (SREDA) alone, rather several organisations work on this sector. The SREDA has been responsible for both the promotion and regulation of renewable energy investment in the private and government sectors. On the other hand, The Bangladesh Power Development Board (BPDB) has also been facilitating renewable energy projects through IPPs to by the way solar power projects, utility scale PV projects, and wind energy projects. Notably, it has initiated waste-to-energy (WTE) projects within the Independent Power Producer (IPP) sector. Moreover, there is a government decision that other than commercial RE projects, social RE projects by the different ministries and agencies as a part of the social responsibility of the Government. This situation makes it hard to track and coordinate the implementation of renewable energy projects.

[38] Shahriar Ahmed Chowdhury, *National Solar Energy Roadmap, 2021 - 2041*, n.d.

[39] Star Business Report, 'NBR Offers 10-Year Tax Benefit for Investments in Renewables', The Daily Star, 30 October 2024, https://www.thedailystar.net/business/news/nbr-offers-10-year-tax-benefit-investments-renewables-3740031.

In terms of governing policies for the private investors in the RE, the government's "Policy Guideline for Enhancement of Private Participation in the Power Sector" and "Policy Guideline for Small Power Plant (SPP) in Private Sector", have been an important development. However, they do not have any special provisions for businessmen working in the renewable energy field. In the recent draft RE policy, SREDA has been tasked with developing a mechanism for introducing Renewable Energy Certificate (REC) and Renewable Purchase Obligation (RPO), while the Bangladesh Energy Regulatory Commission (BERC) will be providing the license for RE plants with a capacity of 5 MW or more.

As mentioned in the previous section, there is a mismatch between the targets set up by the various ministries, and they do not want to share the responsibility.[40] There is a lack of coordination among the sectoral ministries and plans. Moreover, there is no indication that the national renewable energy plans have been streamlined into local development plans. These also make it quite difficult to govern the sector effectively.

3.5 Supporting Policies

Along with the policies that deal directly with the renewable energy sector, there are supporting policies that play a crucial role in the energy transition of a country. These policies include education and awareness about renewable energy which ensures that the general population has an idea about the need for this sector. This also includes campaigns with stakeholders who need the information to be able to implement the policies in their day-to-day practice. Such policies can help to reduce the gap between the government, the business community and the practitioners, which in turn can accelerate the implementation of the government's plan. Mahmud and Roy[41] has suggested that

[40] Interview with an expert on energy policy (civil society)

[41] Hasan Mahmud and Joyashree Roy, 'Barriers to Overcome in Accelerating Renewable Energy Penetration in Bangladesh', *Sustainability* 13, no. 14 (2021): 14, https://doi.org/10.3390/su13147694.it is important to understand how fast-growing countries such as Bangladesh can participate in the global process by sequencing or combining actions to overcome multiple national-level barriers. This study analyzed how national-level barriers interact with one another with a view to better understanding in what order they can be approached in order to overcome them. Interpretive structural modeling was applied for the identification of the interactions among the barriers. The barriers identified from a context-relevant literature survey were cross-validated through in-country expert consultation. Policy makers and the research community were consulted using unstructured as well as structured questionnaire survey methods. The cross-impact matrix multiplication applied to the classification method was used to validate the interactions identified. The results indicated that it is possible to follow a systematic approach to overcome the barriers. The findings show that the highest priority is the need to revisit the current top-down process in policy and governance in the energy sector in Bangladesh. By making room for new institutional arrangements and the strategic role of local experts, stakeholders such as manufacturers, businesses, and users can create a sociopolitical environment that makes it possible to break the current inter-linked chain of barriers. Revisiting the current fuel-specific design and

the renewable energy policy is a top-down energy policy that does not include the necessary supporting policies.

Another important supporting policy is the import duty and other tariffs on renewable energy technology imports.[42] In Bangladesh, as of 2024, there is a high tariff on the import of renewable energy technology such as solar panels. At present, the government of Bangladesh is applying a 26.2 per cent import duty on solar panels, a 37 per cent tax on solar inverters, and a 58.6 per cent import duty on mounting structures.[43] This has made the rooftop solar panels costly. Additionally, there is a lack of support from the government to help investors, both local and international be attracted to this area.

Additionally, the development of the renewable energy sector will require other supporting industries that will help it to grow. An important part of the renewable future is planning for storage facilities. In PSMP2016, nine PSPP candidate sites (the installed capacity of each site is 500MW) were proposed in the Chattogram Hilly Area. Among them, the No. 17 site located in Thanchi Upazila, Bandarban District, is considered the most promising site.[44] The IEPMP also mentions the need for the development of storage facilities. However, there is no evidence of their development. And these need to be considered as well. Additionally, in the long term, the waste disposal of solar PV and other technologies used in the RE sector needs to be considered as supporting policy as well.

IDCOL's clean cooking stoves have also been an important aspect of the reduction in fossil fuel use in Bangladesh. Apart from being important for the energy transition, this also plays an important role in improving the quality of life for rural women who are often affected by health issues due to inhaling smoke and have a

allocation of subsidies and the tariff structure is necessary. Simultaneous supplementary efforts towards human capacity building, the creation of a database for both the demand and supply sides of renewable energy, and improvement in coordination across institutions could be helpful. There is a need for the development of a technology-specific research and development infrastructure to encourage local innovation and business model development. Attention needs to be paid to raising scientifically informed public awareness for the uptake of renewable energy in Bangladesh.","container-title":"Sustainability","DOI":"10.3390/su13147694","ISSN":"2071-1050","issue":"14","language":"en","license":"http://creativecommons.org/licenses/by/3.0/","note":"number: 14\npublisher: Multidisciplinary Digital Publishing Institute","page":"7694","source":"www.mdpi.com","title":"Barriers to Overcome in Accelerating Renewable Energy Penetration in Bangladesh","volume":"13","author":[{"family":"Mahmud","given":"Hasan"},{"family":"Roy","given":"Joyashree"}],"issued":{"date-parts":[["2021",1]]}}},"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"}

[42] Interview with expert on energy (professor from university of Dhaka)

[43] Syful Islam, 'High Import Duties Affecting Solar Deployment in Bangladesh', *Pv Magazine International*, 29 May 2024, https://www.pv-magazine.com/2024/05/29/high-import-duties-affecting-solar-deployment-in-bangladesh/.

[44] IEPMP 2023

heavier work burden due to the collection of wood.[45] To promote RE in Bangladesh, it is important to have such a supporting policy that will assist the country in reaching its renewable energy goals.

In summary, it can be said that the RE sector is facing significant policy gaps and fragmented policies. There is a lack of coherence in the RE targets and vagueness in defining terminology such as 'clean', 'green' and renewable. Furthermore, the sector suffers from neglected local research and development, insufficient financial support beyond basic tax breaks, and high import duties on renewable energy technologies. Governance is fragmented among multiple agencies, leading to poor coordination and a failure to integrate national goals with local-level development plans. These policy gaps in targets, financial mechanisms, technological development, and governance are delaying Bangladesh's progress towards its renewable energy aspirations.

4. Towards a Better Renewable Energy Policy

Given the dual challenge of climate change and energy independence, renewable energy is the future of energy security. As a firm advocate of climate change negotiations, Bangladesh must also uphold its commitments to Nationally Determined Contributions (NDC) and go towards net zero. Around 40 per cent of Bangladesh's emissions come from the electricity sector. Therefore, the energy transition should be designed to achieve both its Sustainable Development Goals (SDGs) and its Nationally Determined Contributions (NDCs). At the same time, the renewable energy landscape has changed quite a lot, and new and emerging

[45] Mariëlle Feenstra, 'Women Engendering the Just Energy Transition', in *Gender and Energy Transition: Case Studies from the Upper Silesia Coal-Mining Region*, ed. Katarzyna Iwińska and Xymena Bukowska (Springer International Publishing, 2022), https://doi.org/10.1007/978-3-030-78416-4_4.the role of women as actors in the energy transition is described using an energy justice and gender lens and with a policy perspective. Based on the concept of agents of change, three roles of actors in the energy transition are identified: consumers, producers and/or decision-makers. Caused by the gender inequalities in society, the agency of women and men are different. Against the backdrop of international commitment, national governments feel the urgency to transform their energy policy towards renewable and efficient energy resources to meet the needs of consumers as well as a commitment to climate change and sustainability goals. Policy interventions towards a just energy transition aim to provide clean and sustainable energy sources for all citizens. The energy justice framework identifies energy injustices based on three tenets: distributive, recognitional, and procedural justice. Insights into the gendered inequalities of energy needs, use, and access could contribute to designing energy transition policies that acknowledge and address current injustices.",",container-title":"Gender and Energy Transition: Case Studies from the Upper Silesia Coal-mining Region",",event-place":"Cham",",ISBN":"978-3-030-78416-4",",language":"en",",note":"DOI:10.1007/978-3-030-78416-4_4",",page":"57-72",",publisher":"Springer International Publishing",",publisher-place":"Cham",",source":"Springer Link",",title":"Women Engendering the Just Energy Transition",",URL":"https://doi.org/10.1007/978-3-030-78416-4_4",",author":[{"family":"Fe enstra",",given":"Mariëlle"}],"editor":[{"family":"Iwińska",",given":"Katarzyna"},{"family":"Bukowska",",given":"Xymena"}],"accessed":{"date-parts":[["2023",10,30]]},"issued":{"date-parts":[["2022"]]}}],"sche ma":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"}

technologies are becoming available. The new integrated master plan for the energy sector in 2023 has attracted criticism from experts.[46] A new renewable energy policy is in draft and is being finalised. Therefore, there is a need for Bangladesh to rethink its renewable energy strategy. For Bangladesh, a major challenge is transitioning to renewable energy, which has a low geographic density of energy production in a land-scarce country and attracts investment in new and emerging sectors. At the same time, energy transition needs to be just that which meets the demand of the future and leaves no one behind. Therefore, the renewable energy policies in Bangladesh need to identify the problems in the sector and plan according to the country's needs.

Bangladesh has some potential in RE, particularly because of its high solar irradiance (5 kWh/m²/day), viable wind (3–4.5 m/s), and tidal potential, which could support diverse RE projects.[47] Over the years, there have been a number of articles that have looked into the renewable energy sector and have suggested that transforming the renewable energy policy will be the key towards advancing in this sector.[48] Here, it should be noted that research has shown that there are differences

[46] Shahriar Ahmed Chowdhury, 'The Many Holes in Bangladesh's Energy Master Plan', The Daily Star, 7 October 2023, https://www.thedailystar.net/opinion/views/news/the-many-holes-bangladeshs-energy-master-plan-3436956.

[47] 'Bangladesh Investment Development Authority', accessed 21 August 2025, https://www.bida.gov.bd/investment-sector/renewable-energy.

[48] Ashish Gulagi et al., 'Current Energy Policies and Possible Transition Scenarios Adopting Renewable Energy: A Case Study for Bangladesh', *Renewable Energy* 155 (August 2020): 899–920, https://doi.org/10.1016/j.renene.2020.03.119; Mahmud and Roy, 'Barriers to Overcome in Accelerating Renewable Energy Penetration in Bangladesh'.a high temporal - spatial resolution linear optimisation tool, is used to model an energy system transition from 2015 to 2050 for the case of Bangladesh. Four scenarios aimed at analysing different energy policies were created in order to replicate the present and alternative renewable energy based policies, with and without greenhouse gas emissions costs. The results show that emissions costs accelerate the transition towards a fully renewable energy system, however, removing these costs does not significantly affect the energy system, as renewables would still contribute 94% of the electricity generation by 2050. The Current Policy Scenario increases electricity and greenhouse gas emissions costs significantly especially, starting in 2025. The results indicate that countries like Bangladesh are prone to serious and complicated national risks that lead to several vulnerabilities like high electricity costs, increase in greenhouse gas emissions, energy insecurity and poor political trust, if present energy policies are pursued. However, focusing on indigenous renewable resources could help mitigate this vulnerability and bring about socioeconomic benefits.",",container-title":"Renewable Energy","DOI":"10.1016/j.renene.2020.03.119","ISSN":"0960-1481","journalAbbreviation":"Renewable Energy","page":"899-920","source":"ScienceDirect","title":"Current energy policies and possible transition scenarios adopting renewable energy: A case study for Bangladesh","title-short":"Current energy policies and possible transition scenarios adopting renewable energy","volume":"155","author":[{"family":"Gulagi","given":"Ashish"},{"family":"Ram","given":"Manish"},{"family":"Solomon","given":"A. A."},{"family":"Khan","given":"Musharof"},{"family":"Breyer","given":"Christian"}],"issued":{"date-parts":[["2020",8,1]]}},{"id":1128,"uris":["http://zotero.org/users/4584671/items/WS7Z8SVY"],"itemData":{"id":1128,"type":"article-journal","abstract":"In the context of the global need for the accelerated penetration of renewable sources in the energy mix, it is important to understand how fast-growing countries such as Bangladesh can participate in the global process by sequencing or combining actions to overcome multiple national-level barriers. This study analyzed how national-level barriers interact with one another with a view to better understanding in what order they can be approached in order to overcome them. Interpretive structural modeling was applied

in patterns of renewable energy transition in different parts of the world and not all country's route to renewable energy can be the same as others.[49] In some countries, economic growth is correlated with renewable energy.[50] Keeping these ideas in mind, the following recommendation may be considered for the development of the renewable energy policies in Bangladesh:

4.1 *Streamline the renewable energy target*

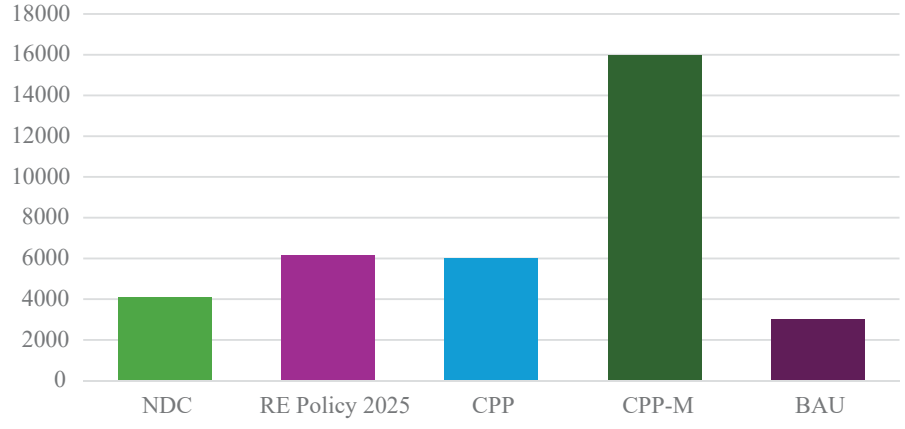
For the longest time, Bangladesh's renewable energy target has been a set up in isolation, with little coordination with each other. This has resulted in a variation in targets that has made it impossible for the country to follow.

for the identification of the interactions among the barriers. The barriers identified from a context-relevant literature survey were cross-validated through in-country expert consultation. Policy makers and the research community were consulted using unstructured as well as structured questionnaire survey methods. The cross-impact matrix multiplication applied to the classification method was used to validate the interactions identified. The results indicated that it is possible to follow a systematic approach to overcome the barriers. The findings show that the highest priority is the need to revisit the current top-down process in policy and governance in the energy sector in Bangladesh. By making room for new institutional arrangements and the strategic role of local experts, stakeholders such as manufacturers, businesses, and users can create a sociopolitical environment that makes it possible to break the current inter-linked chain of barriers. Revisiting the current fuel-specific design and allocation of subsidies and the tariff structure is necessary. Simultaneous supplementary efforts towards human capacity building, the creation of a database for both the demand and supply sides of renewable energy, and improvement in coordination across institutions could be helpful. There is a need for the development of a technology-specific research and development infrastructure to encourage local innovation and business model development. Attention needs to be paid to raising scientifically informed public awareness for the uptake of renewable energy in Bangladesh.",",container-title":"Sustainability",",DOI":"10.3390/su13147694",",ISSN":"2071-1050",",issue":"14",",language":"en",",license":"http://creativecommons.org/licenses/by/3.0/",",note":"number: 14\npublisher: Multidisciplinary Digital Publishing Institute",",page":"7694",",source":"www.mdpi.com",",title":"Barriers to Overcome in Accelerating Renewable Energy Penetration in Bangladesh",",volume":"13",",author":[{"family":"Mahmud",",given":"Hasan"},{"family":"Roy",",given":"Joyashree"}],"issued":{"date-parts":[["2021",1]]}}},"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"}

[49] Farhad Taghizadeh-Hesary and Ehsan Rasoulinezhad, 'Analyzing Energy Transition Patterns in Asia: Evidence From Countries With Different Income Levels', *Frontiers in Energy Research* 8 (July 2020), https://doi.org/10.3389/fenrg.2020.00162.

[50] Taghizadeh-Hesary and Rasoulinezhad, 'Analyzing Energy Transition Patterns in Asia'.

Figure 3: The various goals of the renewable energy achievement in Bangladeshi energy policies (MW) by 2030



Source: Compiled by the Author based on NDC 2021[51], Draft Renewable Energy Policy 2025 and on IEMEP 2023. The BAU projection has been taken from MCPP and IEPMP 2023. (NDC= Nationally Determined Contribution, RE policy= Renewable Energy Policy, BAU= Business as Usual, CPP= Climate Prosperity Plan, CPP-M= Climate Prosperity Plan maximal).

Moreover, different ministries have prepared different targets, and they do not take responsibility for each other. There is a need to agree on a target in renewable energy generation that is based on a realistic projection of the country's energy need.[52] Moreover, the energy target should be reviewed every few years so that it can reflect the changing reality in the technological advancement in RE and the state of implementation at the national scenario. In recent times, the government has been developing a new renewable energy policy. Even in this latest draft, the energy target has gathered criticism from civil society as being too ambitious in setting the target for renewable energy production. Therefore, there is a need to review these targets and ensure that there is a single target for this sector that is enshrined in all relevant policy documents. Sectoral plans also need to include RE goals that will reflect the national target.

4.2 Designate a main executing body with improved government execution

If Bangladesh is to achieve its ambitious RE goals, it needs to have better coordination and governance in the sector. It is not enough to simply set the targets; those targets need to be implemented into action plans. Currently, the RE policies are

[51] Mahmudul Hasan and Asifur Rahman, 'Target to Generate 4,100MW by 2030', The Daily Star, 31 October 2021, https://www.thedailystar.net/business/economy/news/target-generate-4100mw-2030-2210291.
[52] Interview with Energy expert

implemented by different ministries with very little coordination among them. Other than SREDA and BERC, Bangladesh Petroleum Cooperation (BPC), Bangladesh Agricultural Development Corporation (BADC), Infrastructure Development Company Limited (IDCOL), Bangladesh Bank, and Bangladesh Power Management Institute (BPMI) are all named as partners in the RE sector in the draft RE policy 2025. For better execution of the plans made at the government level, there needs to be a coordinating body that will work with all ministries. In this, SREDA can be given more power to oversee the sector, including coordination of all RE projects being implemented by various government agencies. This will become increasingly important as the country looks into exploring offshore energy projects will require even greater ministerial coordination. Since several government agencies are in charge of different responsibilities within the renewable energy sector, there is a need to develop a coordinating mechanism among them.

4.2 Improve Financial Support and Facilitate Investment

The financial requirement for the development of the renewable energy sector cannot be understated. To develop this sector, Bangladesh will need to have fiscal policies that will make the sector attractive to investors. This should include making sure that the investment process is easing the bureaucratic process and providing tax benefits and other financial incentives. The International Energy Agency has predicted that over $2.3 billion will be invested in clean energy and infrastructure in 2024 alone.[53] Bangladesh should aim to capture as much of these investments in the renewable energy sector. It has also been noted by experts that there is significant interest among local businessmen to invest in this sector as well.[54] In that regard, the Bangladesh government needs to have policies that will attract investment in this area. The inclusion of Renewable Purchase Obligation (RPO) and Renewable Energy Certificates (REC) in the draft RE policy 2025 is a welcome policy change, and so is the newly declared tax break. The government has never made specific allocations for the renewable energy sector in the past. There is a need to have a specific budget for renewable energy development as well. The government initiative of providing tax holidays welcomes an initiative in this regard. It should also consider using RE projects to apply for carbon credits under the Paris Agreement Crediting System and the global voluntary carbon markets. With proper policy, renewable energy has great potential to become one of the biggest investment sectors in Bangladesh.

[53] IEA, 'Executive Summary – Renewables 2023 – Analysis', IEA, 2024, https://www.iea.org/reports/renewables-2023/executive-summary.
[54] Interview with energy experts.

4.3 Improve R&D Through Cooperation with International Partners

Renewable energy technologies are improving daily, with new technologies being cheaper than before. R&D will play a crucial role in the future of the energy sector. Therefore, the country needs to invest more in domestic R&D in renewable energy. It is not enough to have vague promises of promote the manufacture of solar energy components. Neither is it enough to say 'may provide a production-like incentive'.[55] There should be a roadmap on which sector of RE will be promoted and how the government should go about it. At the same time, it has to be considered that a country such as Bangladesh cannot invest and develop RE technology in parallel to a developed country. In this regard, the government should consider collaboration with international partners. Many international development partners and partners have expressed their interest in investing in renewable energy in Bangladesh. Bangladesh should prioritise attracting investment in R&D from the development partners. Currently, Bangladesh is also working with many international partners, including World Bank, GPOBA, JICA, IDB, USAID, ADB, KfW, GIZ and so forth.[56] The government of Bangladesh can engage in dialogue with these partners to better

[55] Power Division, Ministry of Power, Energy and Mineral Resources, Government of People's Republic of Bangladesh, "The Renewable Energy Policy 2025"

[56] Shah Mohazzem Hossain et al., 'Sustainable Energy Transition in Bangladesh: Challenges and Pathways for the Future', *Engineering Reports* 6, no. 1 (2024): e12752, https://doi.org/10.1002/eng2.12752.the scarcity of natural resources and increasing costs of fuel in global markets pose significant challenges for developing countries like Bangladesh in managing the rising expenses of electricity generation. Consequently, the government of Bangladesh is exploring alternative energy resources such as solar, wind, hydroelectricity, biomass, and biogas to supplement fossil fuels and optimize electricity generation cost. This paper aims to provide a comprehensive overview of the current status of natural resources, including gas, coal, and oil, which are conventionally used for electricity generation in Bangladesh. It highlights concerns about dwindling resource availability and their impact on the country's energy landscape. Through numerical analysis, it demonstrates the detrimental effects of relying heavily on gas-based power plants, leading to electricity supply instability. To address the ongoing energy crisis, the paper proposes the adoption of renewable energy sources as a viable solution. Additionally, it also acknowledges the challenges associated with implementing large-scale renewable projects in distinct areas of the country, such as limited infrastructure, technical constraints, and the need for significant investment. Overcoming these barriers is crucial for achieving widespread utilization of renewable resources. This paper concludes by offering recommendations to overcome these challenges and maximize the contributions of renewable energy in meeting future energy demands. The suggestions include developing robust infrastructure, implementing policy reforms to attract investment, emphasizing research and development, and promoting community engagement in renewable energy initiatives. It also highlights the potential of renewable energy resources in shaping a more secure and sustainable energy future for Bangladesh, emphasizing the importance of electricity generation for socio-economic development.","container-title":"Engineering Reports","DOI":"10.1002/eng2.12752","ISSN":"2577-8196","issue":"1","language":"en","license":"© 2023 The Authors. Engineering Reports published by John Wiley & Sons Ltd.","note":"_eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1002/eng2.12752","page":"e12752","source":"Wiley Online Library","title":"Sustainable energy transition in Bangladesh: Challenges and pathways for the future","title-short":"Sustainable energy transition in Bangladesh","volume":"6","author":[{"family":"Mohazzem Hossain","given":"Shah"},{"family":"Biswas","given":"Sagor"},{"family":"Raihan Uddin","given":"Md"}],"issued":{"date-parts":[["2024"]]}}],"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"}

develop the sector, not only in investment but in technological collaboration as well. The government should continue to invest in energy and energy efficiency research projects and encourage the local science and technology universities to collaborate with global institutions to advance their capacity.

4.4 Harmonise Local Plans with National Targets

Examples around the world have shown that local governments can indeed be policy innovators for renewable energy, and energy transition needs to happen at multiple levels.[57] Indeed, in Bangladesh, the solar home systems have been the pioneers in renewable energy. Apart from rooftop solar, there are many other ventures where the local levels can be involved in the RE sector. Some of the identified areas where projects can be implemented are: Solar Irrigation, Solar Mini-grid/ micro-grid, Rural health centres, Remote educational institutes, Union e-centres, Remote Religious Establishment, Off-grid Railway Stations and (f) Government and Semi-Government Offices in the off-grid areas.[58] To properly utilise these areas, a robust connection between the national and local governments is necessary. The government should consider the strategies for creating synergies in the sector and make a coordinated effort throughout the system.

At the same time, the local government can promote a focus on education and outreach about the renewable energy sector. While solar rooftops are popular, a lot of common consumers still are not informed properly about becoming prosumers and how it can benefit them financially[59]. It is necessary to educate people about the benefits of having solar rooftops and make this faster and more easily accessible for common users.

4.5 Encourage A Robust Supply Chain

For the smooth development of any sector, having an uninterrupted supply chain is mandatory. For the development of construction, operation and maintenance of RE power plants the country is still largely dependent on imported products. Except for lead acid batteries, a local market for other major RE equipment is simply non-existent in Bangladesh at present. Therefore, there is a need for the Government's intervention in this regard. At present, the government imposes a

[57] Ryoko Nakano et al., 'A Tale of Two Cities: Governing Renewable and Low-Carbon Transitions in Tokyo and Nagano, Japan', in *Renewable Energy Transition in Asia: Policies, Markets and Emerging Issues*, ed. Nandakumar Janardhanan and Vaibhav Chaturvedi (Springer, 2021), https://doi.org/10.1007/978-981-15-8905-8_10.
[58] Chowdhury, *National Solar Energy Roadmap, 2021 - 2041*.
[59] Interview with an Official working in power distribution company

high import duty on the RE infrastructure material needed. The government's logic behind this policy is that it will encourage the local industry to grow. However, it is opined that the situation in Bangladesh is still not a place that can support the RE industry,[60] therefore, the import duty is hurting the RE sector rather than supporting it. Therefore, the government should consider reducing import duty on you know energy infrastructure and machinery. Once the sector booms, the government can introduce another incentive to boost the local industry. Moreover, same as many other sectors, the RE sector also suffers from transportation, shipping delays and quality control issues. These need to be addressed as well. The waste disposal plan of PV system equipment needs to be taken under consideration so that there can be a plan in place for the whole lifetime as well.

5 Conclusion

40 per cent of the country's emissions stemming from the electricity sector, it is essential that the renewable energy policies align with Bangladesh's commitments to its Nationally Determined Contributions (NDCs) and sustainable development goals. However, the progress in renewable energy is not only tied with reducing Bangladesh's CO_2 emission and fulfilling the NDC. The development of the sector is also not being left behind from the technological leap that whole world is undertaking. The renewable energy transition is going on all over the world and if Bangladesh does not become part of this trend, it will be stranded with old technology. Bangladesh's commitment towards expanding its renewable energy sector has been lagging behind due to improper policy intervention. As Therefore, it is pertinent that Bangladesh builds a policy environment that will help it to flourish renewable sector.

This study aimed to analyse Bangladesh's renewable energy policy and proposed measures for enhancing the promotion and integration of renewables into the power system. It developed an analytical framework to evaluate Bangladesh's renewable energy policies, identifying gaps and proposing improvements. Building on Daszkiewicz's energy transition framework, it incorporates additional elements tailored to the needs of developing countries like Bangladesh. Policies are categorised into five areas: (1) Policy Instruments, focusing on targets and strategies with clear mandates and structures; (2) Financial Support, including subsidies, feed-in tariffs, tax benefits, and renewable auctions; (3) Technological Development, addressing energy efficiency, and research and development; (4) Governance, involving regulatory bodies, implementation plans, and intersectoral coordination; and (5) Supporting Policies, covering education, training, and other policies necessary for

[60] Interview with Energy expert

the flourishment of the sector. This comprehensive framework integrates literature reviews, international policy comparisons, and insights from expert interviews to provide a holistic approach to renewable energy policy analysis.

The study found that Bangladesh's renewable energy policies lack coordination, funding, and actionable plans, making it difficult to achieve long-term energy transition goals. Bangladesh's renewable energy plans lack clear, binding targets and cohesive roadmaps. Major policy documents, such as the IEPMP 2023, focus more on nuclear and untested technologies than renewables, making it unlikely to meet the 40 per cent renewable energy goal by 2041. Local integration and plans for non-solar renewables are also absent. R&D in renewable energy is underfunded and overlooked, with a limited focus on energy-efficient technologies and advanced systems like carbon capture. The renewable energy sector also suffers from inadequate financial incentives. High import tariffs and limited subsidies discourage investment, despite some tax breaks and net metering policies for prosumers. Fragmented institutional roles and poor coordination among ministries hinder implementation. National renewable energy plans lack integration into local frameworks, while governance policies do not adequately support private sector involvement in renewables. High tariffs on renewable technology imports, limited public awareness campaigns, and underdeveloped storage and waste management systems slow progress.

To advance the RE sector, Bangladesh must streamline renewable energy targets, improve governance through a centralised coordinating body, attract investment with fiscal incentives, and enhance research and development (R&D) via international collaborations. Local governments can play a pivotal role in implementing decentralised solutions like solar mini-grids and rooftop systems while raising public awareness. Addressing supply chain challenges, including import duties and waste disposal planning for photovoltaic systems, is critical. By fostering an integrated, just, and inclusive energy transition, Bangladesh can effectively harness renewable energy to meet future demands while reducing emissions. Renewable energy can help Bangladesh in realising its dreams of development that leaves no one behind, while ensuring a better less polluted environment for future generations.